

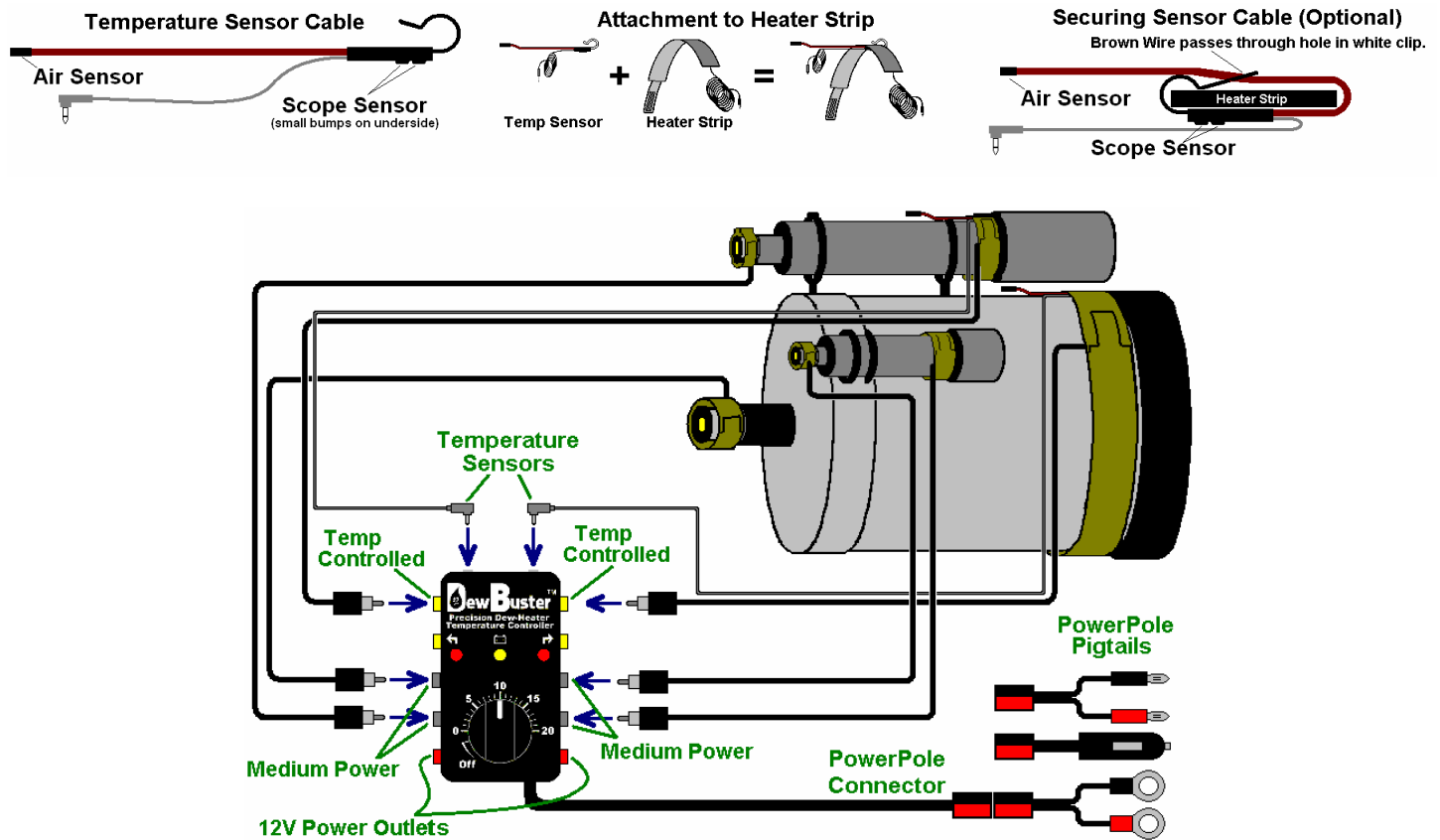
DewBuster™ Controller Instruction Manual

QUICK START GUIDE

The RCA output jacks are color coded for easy identification:

YELLOW	= Temperature Controlled Outputs
BLACK	= Medium Power Outputs
RED	= 12V Power / Full Power Outputs

The diagram below shows the standard configuration (your controller may differ):



As shown above, attach Temperature Sensor to Corrector Plate (or Objective Lens) heater strip and place heater just behind dew shield (the goal is to warm the tube just behind the glass). Plug heater into a yellow Temperature Controlled Output and plug Temperature Sensor into input jack on same side as heater was plugged into. If a second Temperature Sensor is being used (on a guide scope for example), the heater should be plugged into the yellow jack on the opposite side of the controller and the sensor plugged into the associated input jack. NOTE: When a Temperature sensor is not plugged in, the yellow outputs associated with that input will run at Medium Power and function as described below.

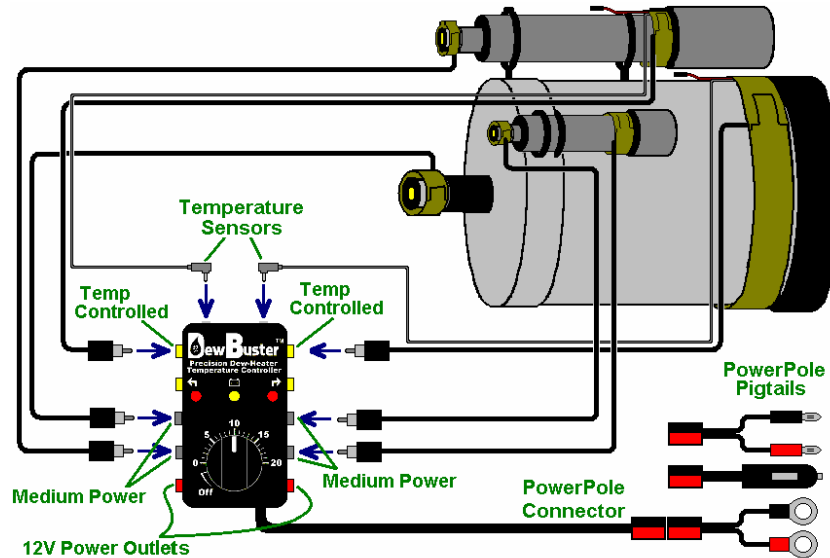
Attach heaters strips to the eyepiece, finder scope, Telrad, etc. and plug these heaters into any of the black Medium Power Outputs (or yellow outputs that are functioning as Medium Power outputs).

If you have any 12V accessories they may be plugged into the red 12V Outlets. Note that these outlets are not regulated; they will be the same voltage as the controller's power source. The 12V Outlets may also be used as Full Power Outputs for any heater that you wish to run at full power (constant 12V).

NOTE: These instructions are tailored for SCT and Refractor Telescopes. If you are using a Newtonian telescope the NEWTONIAN AND BIG DOB INSTRUCTION MANUAL may be downloaded from www.dewbuster.com

OVERVIEW

Heat prevents dew, but too much blurs the highly magnified image in your telescope. Your DewBuster™ Controller measures temperature and precisely controls power to the heater in order to warm the lens just above the air temperature resulting in optimal telescope performance and saving battery power. The Temperature Sensor Cable clips onto your heater strip measuring both air and telescope temperature and plugs into either the Left or Right Temperature Sensor Input controlling the Temperature Controlled Outputs (yellow) on that side. The DewBuster's control knob determines how many °F the telescope is warmed above the air temperature (5 means telescope 5°F warmer than the air). When no temperature sensor is plugged in, the Temperature Controlled Outputs on that side are not wasted because they function as Medium Power Outputs and function as described below.



The Medium Power Outputs (color coded black) are intended for small heaters such as finderscope, eyepiece, Telrad, etc. These heaters do not use much power and do not affect telescope performance so instead of measuring their temperature, they are simply run at a higher power level than the Temperature Controlled Outputs (40% minimum) which prevents dew without the need for a sensor. While the black Medium Power Outputs will always operate at Medium Power, when no Temperature Sensor is plugged in the yellow Temperature Controlled Outputs are not wasted, they will function as additional Medium Power Outputs. Medium Power operates at a 40% duty cycle when the control knob is set within the normal operating range of 0 to 10. If the control knob is set higher the power level increases gradually (LED's on longer) until it reaches Full Power (LED's remain on) at a control knob setting of approximately 20. This can be useful for manually controlling power level when no temperature sensors are being used.

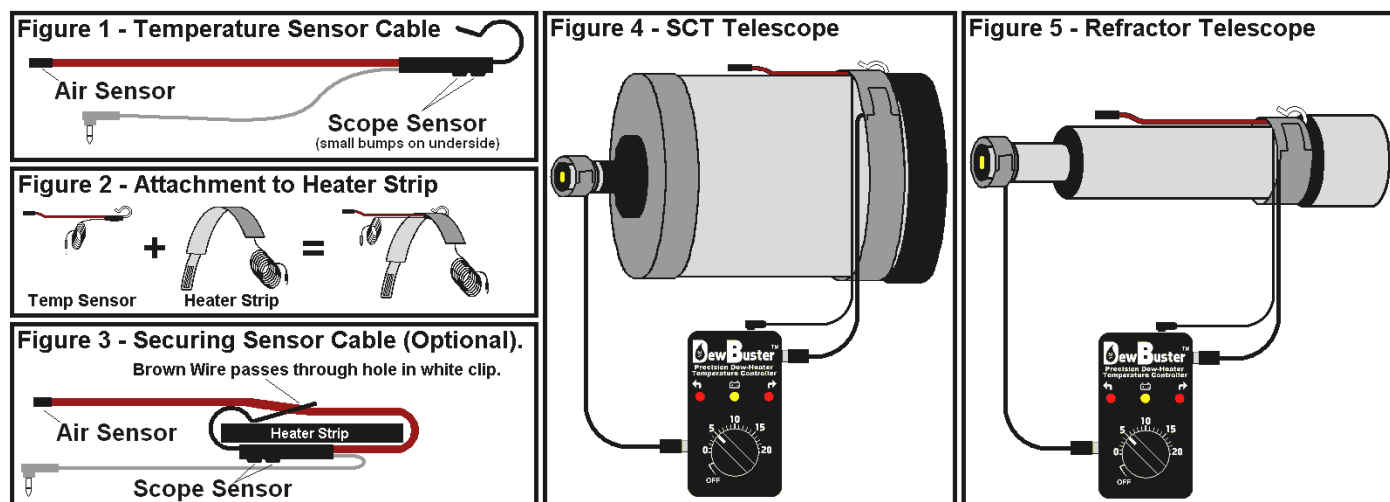
The DewBuster™ Controller has 3 LED's:

LEFT and **RIGHT** – these red LED's blink as the LEFT and RIGHT Temperature Controlled Outputs (yellow) are pulsed with 12V power to control the temperature. The longer the blink time the more heat will be generated (Pulse Width Modulation). The red LED's may also be used to check the Medium Power blink rate by unplugging the Temperature Sensor. The LED's are optimized for night vision and thus may be difficult to see during daytime.

CENTER – this yellow LED serves as a Battery Warning light. When it starts blinking your battery is low on charge (unplug items that you can do without). As the battery weakens blink rate of yellow LED increases and heater power is gradually reduced (red LED's blink less) to keep battery from discharging below 10.5V. When battery is exhausted red LED's will remain off (heaters off) and the yellow light will remain on (voltage low) but your battery is protected from damage. If yellow LED illuminates with a fully charged battery or power supply check for poor connections and that your power source can provide sufficient current. If you need assistance contact Tech Support (page 4).

Your DewBuster™ Controller is fully compatible with Dew-Not, Astrozap, Kendrick, and many other 12-Volt heating strips. You may also build your own heaters (instructions at www.dewbuster.com) and your warranty even covers damage caused by mistakes building your homemade heaters. The unit is fully protected from reverse polarity, over-current, and shorted heaters (if red LED goes out when a heater is plugged in, that heater has a short). The controller is rugged and may be operated continuously 24/7.

Installation on Your Telescope



TEMPERATURE CONTROLLED HEATERS:

NOTE: If Sensor Cable is unplugged the associated outputs (yellow) operate as Medium Power Outputs.

- Attach Sensor Cable (Fig.1) to heater strip as shown in Fig.2. If desired, Sensor Cable may be secured to heater strip by passing brown wire through hole in white plastic clip as shown in Fig.3.
- Attach heater strip to telescope (Fig. 4 or 5) making sure Scope Sensor (Fig.1) contacts telescope tube and Air Sensor does not touch anything. **NOTE: The best location for the heater strip is just behind the corrector plate casting (Fig.4) or refractor dew shield (Fig.5) so that it warms the air inside the telescope as close to the lens as possible. Do not place heater around dew shield because the heat will just escape into the atmosphere.**
- On an SCT Telescope install the dew shield taking care that the Sensor Cable remains in position. It is imperative to use a dew shield and if you do not have one they can be easily made (see instructions at www.dewbuster.com).
- Plug Sensor Cable(s) into Left or Right Sensor input (Fig. 4 or 5) and plug heater strip into the associated Temperature Controlled Output (color coded yellow, see diagram on page 1).

MEDIUM POWER HEATERS:

- Install heater strips and plug into any Medium Power output (black) or into a Left Output or Right Output that is operating in Medium Power Mode (Temperature Sensor Cable unplugged).

12V OUTPUTS:

The 12V outputs (color coded red) may be used to power accessories (10 Amps maximum per RCA jack) or to drive a heater at full power (constant 100% output). **Center terminal is +.** Note that they do not turn off when the control knob is turned to the OFF position and they are not regulated, the voltage will be the same as the DewBuster™ Controller's power source.

TURNING ON CONTROLLER:

- Connect controller to 12 Volt battery or 13.8VDC power supply.
CAUTION: Do NOT power controller from your telescope's DC Power Output Jack because the high current may burn up wires inside your telescope! Also do not use a power source greater than 15 VDC because the high voltage may damage your heaters strips.
- Turn control knob to desired setting (first time users see DETERMINING TEMPERATURE SETTING below).
- The Temperature Controlled Output may go to full power (LED on) as telescope warms up, but should blink when it reaches correct temperature. The LED may stop blinking for a short time if the telescope needs to cool down.
- The middle Battery Warning LED should not illuminate.

DETERMINING TEMPERATURE SETTING:

- The lowest setting that prevents dew will deliver the best telescope images. As a starting point set the control knob to 5 degrees (10 degrees for 12" or larger scopes). Operate at this setting for the first night and if no dew forms then try a slightly lower setting each subsequent night until dew forms.
- If dew forms, temporarily unplug the Sensor Cable and turn the control knob to maximum. When the dew clears plug the Sensor Cable back in and set the control knob higher than the setting where dew formed.
- Once you learn the ideal setting for your telescope, just set it there each night and forget about it. The ideal setting should prevent dew from forming under all conditions. Do not readjust the setting throughout the night as this prevents your telescope from reaching thermal equilibrium and performing at its best.

Dew Burn-Off Mode - It takes much more heat to clear dew than to prevent it from forming in the first place. To remove dew, place the controller in Dew Burn-Off mode by unplugging the Sensor Cable(s) and turning the control knob to maximum. All outputs will go to full power (red LED's remain on). After the dew clears, plug the Sensor Cable(s) back in and return the control knob to a slightly higher setting than when the dew formed.

Moisture Inside Telescope – condensation inside a closed tube telescope is not dew but rather moisture that has been trapped inside your telescope. This usually occurs during winter months when a telescope that was stored indoors is brought out into the cold outside air. Indoor air is warm so it absorbs moisture and has at best a 50 degree dew point. If that air enters the telescope, when it is brought outside and cools below 50 degrees the moisture condenses onto the interior optical surfaces. This moisture can not be removed with just a dew heater, the air must be replaced by drier outside air. **During winter:** Uncap telescope as soon as it is brought outside so that the humid air inside can escape. If the problem is particularly bad, buy or build an SCT cooler (a device which blows outside air into telescope pushing out the air trapped inside). At the end of your observing session, dry any moisture from the exterior of the telescope and place the tube in an air-tight plastic bag to prevent condensation when the telescope is brought indoors. Do not remove the telescope from the bag until it has warmed up to the indoor air temperature and keep the openings capped as much as possible. If desired, the telescope can be left in the bag for storage since the dew point of the air within the bag is much drier than the air within your home. **During summer:** The telescope should be stored in an air conditioned environment because it is less humid. To prevent the lenses from fogging up when the cool telescope is brought outside, put the telescope in a bag or keep the lenses capped until the telescope has warmed to the outside air temperature. Since the air conditioned environment is drier, when the telescope is brought back indoors you may uncap the telescope to allow any moisture to dry up.

Troubleshooting Problems

Symptom	Most Likely Cause
Center of corrector plate or lens dews up.	<ul style="list-style-type: none"> • Be sure to use a dew shield (heater strip alone can't keep up with corrector plate heat loss). • Is heater strip installed just behind corrector plate casting or lens dew shield? This is the most effective because it warms the air inside tube just behind lens. • Temperature set too low. See "DETERMINING TEMPERATURE SETTING" on page 2.
Center LED blinks yellow	<ul style="list-style-type: none"> • Battery low on charge, poor connections, or power source unable to supply enough current for dew heaters.
No LED's lit.	<ul style="list-style-type: none"> • Check that wires are not reversed on your power source. • LED's are optimized for night time conditions and thus may be difficult to see during daylight. • Is cigarette plug power LED lit? Check that plug is fully inserted into socket, battery polarity is correct, and fuse is not blown (AGC10 fuse is accessed by unscrewing tip of cigarette plug). • Heavy Duty power cord has PST fuse, disconnect power and fuse will reset when it cools off.
One LED will not illuminate.	<ul style="list-style-type: none"> • A heater may be shorted, unplug heaters one at a time and if LED comes on that heater has a short in it. Check the heater per Tech Bulletin "RCA Plug Shorts" at www.dewbuster.com . Shorts may be intermittent so check heater even if problem disappears.
Temp Controlled LED stays on constantly.	<ul style="list-style-type: none"> • Normal when first turned on, but LED should start blinking after scope warms up. • Temperature Sensor not making contact with telescope (page 2 Fig.1) or unplugged. • Air Sensor (page 2 Fig.1) too close to warm object like a heater strip or your body. • Check that proper side of heater is against metal part of telescope and getting warm.
Battery runs down very quickly	<ul style="list-style-type: none"> • Shorted heater strip (see Tech Bulletin "RCA Plug Shorts" at www.dewbuster.com). • Insufficient battery capacity, use at least 17AH battery for an 8" SCT. • If dead battery recharges very quickly it is not storing energy and should be replaced.

Warranty and Technical Support

Your DewBuster™ Controller is warranted to the original purchaser for 5 years from the date of purchase. If it fails for any reason, contact me for return instructions. I will expedite the repair to minimize the time you are without your controller. Failures beyond the warranty period and controllers purchased second hand will be repaired at a flat-rate fee. Contact me for a quote.

Ron Keating
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E-mail address changes frequently due to spam so go to:

www.dewbuster.com

and click on CONTACT ME for current e-mail address.